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(54) **DRIVE UNIT**

ANTRIEBSEINHEIT

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Description

Technical field

[0001] The subject invention refers to a drive unit for a handheld working tool, such as a chain saw, trimmer or hedge trimmer, said drive unit essentially comprises a housing part with a fuel tank and an engine unit with a fuel flow unit, such as a carburetor, a muffler and a crankcase scavenged combustion engine, with cylinder, piston and crankshaft.

Background of the invention

[0002] Due to requirements of low weight and compact design portable working tools are usually run by a crankcase scavenged two-stroke engine. However, a crankcase scavenged four-stroke engine is also conceivable. As a result of the crankcase scavenging the engine is lubricated by oil in the fuel. This means that the tool can be used and managed in different directions during running, i.e. sideways or upside-down. The tools usually have a carburetor connected to an inlet duct, but also a low pressure injection system can be of interest. Since the tool can be used in a lot of positions there is a risk for fuel drops to accumulate inside the inlet duct and then be tipped into the cylinder when the tool's inclination is changed. This can bring about that the engine stops. The greatest risk for this is at lower engine speed. This has also brought about that the carburetor usually is placed near the inlet port, i.e. that the inlet duct is short. Considering engine power at operating speed it would however be preferable to use a longer inlet duct. This could however be associated with said difficulties as well as pure space problems. Therefore the carburetor usually is placed adjacent the cylinder's top section, and provided with some kind of heat protecting baffle. This baffle implies a complication at the same time as temperature problems can still arise for the carburetor. Furthermore, the inlet duct is usually turned obliquely down towards the crankcase. Owing to this the inlet gases can not assist in cooling the critical area around the exhaust port.

Purpose of the invention

[0003] The purpose of the subject invention is to substantially reduce the above outlined problems.

Summary of the invention

[0004] The above mentioned purpose is achieved in a drive unit, in accordance with the invention, having the characteristics appearing from the appended claims.

[0005] The drive unit according to the invention is thus essentially characterized in that at least one inlet port is located in the engine cylinder wall and/or in an adjacent part of the engine crankcase, and that the engine inlet

duct from the inlet port up to the fuel supply unit has a length longer than 1.8 times the engine cylinder stroke, preferably longer than 2.0 times the cylinder stroke. The long inlet duct gives advantages but also implies a number of risks as mentioned above. It requires an elaborate drawing of the inlet duct so that the risk for fuel drops to accumulate in the inlet duct is reduced. Furthermore it is advantageous to have a long preheated section of the inlet duct, which vaporizes fuel drops and thus reduces said risks. By a suitable angling of the inlet duct a cooling effect can also be created around the cylinder's exhaust port and adjacent parts of the piston. These and other characteristic features and advantages of the invention will become apparent from the following detailed description of various embodiments with the support of the annexed drawing.

Brief description of the drawing

[0006] The invention will be described in closer detail in the following by way of various embodiments thereof with reference to the accompanying drawing, in which the same numbers in the different figures state one another's corresponding parts. Alternative parts are designated by a sign ' and are shown with dash-dotted lines, e.g. handle 20' in figure 1 is an alternative to handle 20.

[0007] Fig. 1 shows a drive unit in accordance with the invention seen in a lateral cross-sectional view. In this case the drive unit is intended for a chain saw, whose guide bar 23 is marked with dash-and-dot lines. However, the drive unit can also be used for other applications, such as a hedge trimmer or trimmer.

[0008] Fig. 2 is a partial enlargement of figure 1.

[0009] In the schematical figure 1 numeral 1 designates a drive unit in accordance with the invention. The drive unit is essentially composed of a housing part 2 with a fuel tank 3 and an engine unit 4. The engine unit 4 is composed of a crankcase scavenged combustion engine 7 with a fuel supply unit 5, such as a carburetor and a muffler 6. The drive unit in the figure is intended for a chain saw of so called "top-handle" model, i.e. a chain saw with an on-top lying handle. This type of chain saw is usually small and light-weight and has such a balance that certain kind of cutting can be made with one hand only. The saw is then to be held in the handle 20, which is a throttle handle. It is provided with a throttle control 21 which the operator controls by a finger. However, the drive unit can also be used for other applications. In case it is used for a so called trimmer the unit itself has no handle 20, but is then placed on a rig tube connected to the drive unit. For, in this case the control cables and/or electric cables extend from the handle to the drive unit, for control of engine speed and stop function. The rig tube extends in the prolongation of the engine's crankshaft, whose centre is designated by numeral 17, i.e. perpendicularly towards the illustrated plane of the figure.

[0010] When starting the tool, usually by using starter

rope, it is placed on the ground 25. The drive unit 1 can also be used for a chain saw with conventional handles. Such kind of chain saw has a rear handle 20' with throttle control 21' and a side handle which is not shown here. In that case the handle 20 is omitted. This kind of chain saw should always be used with two hands, which is recommendable from a safety point of view. In both cases the guide bar 23 with saw chain are arranged in a conventional way.

[0011] Figure 2 thus shows the drive unit 1 enlarged. The engine unit 4 is attached to a housing part 2, which also comprises handle 20 with throttle control 21. The engine unit 4 in question is a one-cylinder two-stroke engine, usually with a displacement between 25 and 100 cc. It is air-cooled and therefore provided with a large number of cooling fins 26 and with a cooling fan, which is not shown here. The engine unit has a cylinder 8 with a piston 15 with a piston rod 29, which rotates the engine's crankshaft, with centre 17. The engine has an inlet port 9 with an associated inlet duct 13. Furthermore it has an exhaust port 16 with a directly mounted muffler 6. A spark plug 24 connects to the engine's combustion chamber 14. All this is entirely conventional and will therefore not be further examined. The piston 15 is located in its upper dead center. A centre line 30 for the cylinder extends down through the crankshaft centre 17. In this case also crank pin centre 31 is located on the centre line 30. The distance between crank shaft centre 17 and crank pin centre 31 represents half of the engine's cylinder stroke 18, which is marked in the figure.

[0012] The engine has an extremely long inlet duct 13. This creates opportunities for increasing the engine's traction power at normal operating speed, and can give higher power and/or cleaner exhaust gases at operating speed. For, owing to increased throttling on the exhaust side less exhaust emissions can be achieved with retained power, i.e. an advantage of power and/or emission. The reason for this improvement is that a higher engine charging efficiency can be obtained at the present engine speed. This is achieved due to a more favourable Helmholtz resonance frequency. The resonance frequency is determined essentially by the relation between the length of the inlet duct and the crankcase volume, which is relatively well reflected by the cylinder stroke 18. From a calculation point of view the distance from an airfilter 32 to the inlet port 9 is mostly representative as the length of the "inlet duct". However, it is also advantageous to place the filter adjacent the fuel supply unit 5 in order to reduce disturbances from pressure variations, so called "quarter-waves". There are a lot of reasons why long inlet ducts are not being used for these drive units. Obviously, a long inlet duct takes up a great deal of space which is critical for a handheld working tool considering its demand for being compact and low-weight. However, a more serious problem, when handling the tool, is the risk of engine stop, especially in connection with idling. This is due to the fact that fuel drops accumulate in the long inlet duct 13. When

handling the tool the result can be that fuel is being poured into the engine which then stops. However, it has turned out that these risk factors can be reduced by using a very elaborate shaping of the inlet duct's geometry and by using a long preheated section of the inlet duct. Normally the engine has an inlet port 9 located in the engine cylinder wall 10 and/or an adjacent part of the engine crankcase 11. This location creates conditions for an advantageous drawing of the inlet duct 13. Preferably the opening and closing of the inlet port is controlled by the movement of the piston 15, but the inlet duct can also be provided with a so called reed valve. The inlet duct from the inlet port 9 on to the fuel supply unit 5, has a length longer than 1.8 times the engine cylinder stroke 18, preferably longer than 2.0 times the cylinder stroke 18.

[0013] The inlet duct 13 has a long preheated end section 12. Fuel drops can hereby be vaporized in this section, so that a homogeneity of the fuel mixture can be achieved. The end section 12 is embodied so that it forms a fixed and heat conducting part of the cylinder 8 and has preferably a length longer than 0.8 times the engine cylinder stroke, preferably longer than 1.0 times the cylinder stroke. Preferably the end section 12 is cast in one piece together with the cylinder 8, but it can also consist of a firmly mounted tube.

[0014] As appears from the figure inlet duct 13 is directed towards the cylinder's top section with the combustion chamber 14. Otherwise these tools' inlet ducts normally have an opposite direction, i.e. down towards the crankcase.

[0015] This can provide a somewhat lower inflow resistance. The advantage of having the direction towards the cylinder's top section is that the inflowing gases are cooling the piston 15 and the cylinder wall 10 at the engine exhaust port. Hereby the risk of engine seizure is reduced. In the present application the cylinder is almost completely lying down and the inlet duct 13 has a strong inclination in relation to the cylinder's centre line 30. However, the cooling effect can also be achieved at less inclination. The determining fact is that the end section 12 of the engine inlet duct 13 up to the inlet port 9 differs from a perpendicular direction in relation to the cylinder's axial extension and is directed more towards the exhaust port 16 and combustion chamber 14 of the cylinder. Then the inlet gases will be deflected, either towards the piston or towards the cylinder wall, and thus create the desired cooling effect.

[0016] As mentioned, the drive unit in accordance with the invention, can be used both for a working tool with a vertical crankshaft, such as a hedge trimmer, or for a tool with a horizontal crankshaft. The orientation is then related to when the tool is placed on horizontal ground. In the shown embodiment crankshaft 17 is essentially horizontal and the cylinder 8 has an essentially horizontal axial extension, i.e. its centre line 30 inclines more than 45 degrees in relation to a vertical line, and its inlet duct 13 and fuel supply unit 5 are essentially

located on top of the cylinder 8, i.e. above a plane which extends through the crankshaft centre 17 and the cylinder centre 30. The location of the fuel supply unit and the drawing of the inlet duct are of very great importance. In the present case it runs with an even inclination down towards the cylinder where it bends and then runs somewhat more steep at the port 9 proper. When the tool is standing on plane ground 25 and at the same time is idling, some fuel drops inside the inlet duct can thus flow down into the cylinder all the time. This continuous supply is much more propitious than if a larger quantity would suddenly flow down. This could happen if the inlet duct should have a horizontal part where a fuel pool could stay. When the user is lifting the tool up the pool can be released by another inclination and flow down into the tool causing engine stop. In figure 2 is shown a connection 38 in the end section 12. For the sake of clarity the connection is only shown in the enlarged figure 2. It combines the inlet duct 13 with the crankcase 11, so that fuel drops can run from the inlet duct to the crankcase. Hereby a certain improvement of the idling is achieved. Preferably the connection has a collecting part, which debouches in the wall of the end section 12, having a diameter of approximately 3 mm, and another part, which debouches in the crankcase, having a smaller diameter, approximately 1 mm. A placing of the connection 38 adjacent the outer mouth of the end section 12 will make it possible and easy to drill the holes through the mouth of the end section.

[0017] In the present case inlet duct 13 consists of, on the one hand the propitious preheated end section 12, and on the other hand an upstream part 19, which is associated with the end section 12 and continues on to the fuel supply unit 5. The upstream part 19 has an essentially smooth inner side. Otherwise it is more common to use folded rubber constructions for the upstream part 19 of the inlet duct. This is due to the fact that it is more common to use an anti-vib carburetor. In that case the engine unit 4 is elastically suspended in the housing part and the fuel supply unit 5 is mounted into the housing part and the upstream part 19 of the inlet duct is made of a compliant material, such as rubber. Hereby the engine itself moves while the carburetor and the drive unit with handle 20 is vibrating much less. In the present case three elastic attachments 37 are used, usually steel springs for mounting of the combustion engine proper. The upstream part 19 is located adjacent the drive unit's movement centre, which results in small movements in the part 19 and allows using a flat tube. The upstream part 19 thus continues essentially in the same direction as the end section 12 on to the fuel supply unit 5.

[0018] Hereby an even inclination down towards the cylinder is created, and the cylinder is lying substantially horizontal. The inlet duct 13 runs away from the top section of the cylinder 8 where commonly a spark plug 24 is located. The inlet port 9 is preferably located in the cylinder wall 10. This arrangement creates conditions,

on the one hand for a long inlet duct 13 with a long preheated section 12, and on the other hand for an advantageous placing of the fuel supply unit 5.

[0019] Said unit will thus be situated far away from the warmest parts of the engine, which is an obvious advantage. An airfilter 32 is connected to the fuel supply unit 5 with some kind of quick fastening. In this case there is a screw handle 33 which fastens the filter 32. The filter 32 is located at one side of the drive unit, said side is essentially opposite to that side where the cylinder's top section is located. This makes it easy to change filter 32 by loosing the screw handle 33 and a protective cover 34.

[0020] In the shown embodiment of the top handle saw, the cylinder is almost lying down, i.e. the centre line 30 inclines less than 15 degrees in relation to the horizontal ground 25, which goes along the tool's under edge. Hereby the handle 20 with the throttle control 21 can be placed above the engine unit, and very close to it. The handle's longitudinal direction is essentially parallel with the centre line 30 of the cylinder. This enables a saw with good balance characteristics and a low total height. The handle 20 is located as far ahead that the throttle handle proper will be located essentially just above the crankshaft centre 17 which contributes to the good balance. The fuel supply unit 5 is located in front of a recess 22 in the handle 20, i.e. more far away from the cylinder's top section. This means that the long inlet duct 13 is not only contributing to a powerful engine, but also to that the handle can be placed low down to give the tool a low total height. To be able to give throttle with the throttle control 21 a conventional safety catch 35 in the handle 20 must be pushed in. A lifting hole 36 is located in the rear part of the handle. By connecting a lifting strap to this hole the user can carry the chain saw and still have both hands free. The guide bar 23 of the saw, with the saw chain, is directed essentially towards the same direction as the fuel supply unit 5, i.e. away from the cylinder's top section. This also results in a special advantage when removing a saw which has got stuck in a tree. The elastically suspended engine unit is then moving in a direction towards the fuel supply unit 5 and the rubber tube will be compressed instead of being pulled out or folded. This is advantageous as regards durability. In this case the housing part 2 has three tanks, one fuel tank 3 with an adherent expansion tank 27, and one tank for chain oil 28. Naturally this kind of tank is particular for chain saw applications. One problem with a horizontal cylinder is that the muffler 6 end up under the cylinder. This kind of problem is in this case reduced in that the exhaust port 16 and the scavenging ducts, which are not shown here, are being turned with an angle of 15 degrees in relation to a vertical angle. By this turning the muffler 6 will be turned out with the corresponding angle to one side and thus get more space. In this case the inlet port 9 has also been turned with an equally large angle of 15 degrees. However the inlet port shouldn't necessarily be turned with the same angle as

the other ones. Obviously the turning angle can be varied thus being somewhat larger or smaller. As becomes apparent from the figure one of the crankcase halves is integrated in the cylinder, and the end section 12 of the inlet duct runs down to the parting plane of the crankcase halves.

Claims

1. A drive unit (1) for a handheld working tool, such as a chain saw, trimmer or hedge trimmer, said drive unit essentially comprises a housing part (2) with a fuel tank (3) and an engine unit (4) with a fuel supply unit (5), such as a carburetor (5), a muffler (6) and a crankcase scavenged combustion engine (7), with a cylinder (8), a piston (15) and a crankshaft with a centre (17), **characterized in that** the engine (7) has at least one inlet port (9) located in the engine cylinder wall (10) and/or an adjacent part of the engine crankcase (11) and that the engine's inlet duct (13) from the inlet port (9) up to the fuel supply unit (5) has a length longer than 1.8 times the engine cylinder stroke (18), preferably longer than 2.0 times the cylinder stroke (18).
2. A drive unit (1) according to claim 1, **characterized in that** an end section (12) of the engine's inlet duct (13) is embodied so that it forms a fixed and heat conducting part of the cylinder (8) and has a length longer than 0.8 times the engine cylinder stroke, preferably longer than 1.0 times the cylinder stroke.
3. A drive unit (1) according to the claims 1 or 2, **characterized in that** the end section (12) of the engine's inlet duct (13) up to the inlet port (9) differs from a perpendicular direction in relation to the cylinder's axial extension, and is directed more towards the exhaust port (16) and combustion chamber (14) of the cylinder, whereby the piston (15) and the cylinder wall (10) at the engine exhaust port (16) will be cooled
4. A drive unit (1) in accordance with anyone of the preceding claims, **characterized in that**, when the tool is placed on horizontal ground the crankshaft (17) is essentially horizontal and the cylinder (8) has an essentially horizontal axial extension, i.e. its centre line (30) inclines more than 45 degrees in relation to a vertical line, and its inlet duct (13) and fuel supply unit (5) are essentially located on top of the cylinder (8), i.e. above a plane which extends through the crankshaft centre (17) and the cylinder centre (30).
5. A drive unit (1) in accordance with anyone of the preceding claims, **characterized in that** an upstream part (19) of the engine's inlet duct (13) is as-

sociated with the end section (12) and continues on to the fuel supply unit (5).

6. A drive unit (1) in accordance with the claims 4 or 5, **characterized in that** a handle (20) with a throttle control (21) is located above the engine unit (4) so that the longitudinal direction of the handle is essentially parallel with the centre line (30) of the cylinder.
7. A drive unit (1) according to claim 6, **characterized in that** the throttle handle (21) proper is located essentially just above the crankshaft centre (17).
8. A drive unit (1) in accordance with the claims 6 or 7, **characterized in that** the fuel supply unit (5) is located in front of a recess (22) in the handle (20), i.e. in a direction more far away from the cylinder's top section.
9. A drive unit (1) in accordance with anyone of the preceding claims, **characterized in that** the inlet port (9) is located in the cylinder wall (10) and **in that** its opening and closing is controlled by the movement of the piston (15).
10. A drive unit (1) in accordance with anyone of the claims 4-9, **characterized in that** in a chainsaw application the guide bar (23) of the saw, with the saw chain, is directed essentially towards the same direction as the fuel supply unit (5), i.e. away from the cylinder's top section.
11. A drive unit (1) in accordance with anyone of the claims 5-10, **characterized in that** the engine unit (4) is elastically suspended in the housing part (2) and the fuel supply unit (5) is mounted in the housing part, and **in that** the upstream part (19) of the engine's inlet duct (13) is made of a compliant material, such as rubber.
12. A drive unit (1) according to claim 11, **characterized in that** the upstream part (19) has an essentially smooth inner side.
13. A drive unit (1) in accordance with the claims 5, 11 or 12, **characterized in that** the upstream part (19) continues essentially in the same direction as the end section (12) up to the fuel supply unit (5), which is located at one side of the drive unit (1), said side is essentially opposite to that side of the drive unit where the cylinder's top section, commonly with a spark plug (24), is located.

Patentansprüche

1. Eine Antriebseinheit (1) für ein Handarbeitswerk-

zeug, wie zum Beispiel eine Kettensäge, eine Kan-
tenfräse oder einen Heckenschneider ,wobei die
Antriebseinheit im wesentlichen umfasst:

einen Gehäuseteil (2) mit einem Treibstofftank
(3) und eine Motoreinheit (4) mit einer Treib-
stoffzuführungseinheit (5), wie zum Beispiel ei-
nem Vergaser (5), ein Auspufftopf (6) und einen
über ein Kurbelgehäuse gespülten Verbren-
nungsmotor (7) mit einem Zylinder (8), einem
Kolben (15) und einer Kurbelwelle mit einem
Mittelpunkt (17),

dadurch gekennzeichnet, dass der Motor (7) we-
nigstens eine Einlassöffnung (4) aufweist, die sich
in der Zylinderwand des Motors und/oder einem an-
grenzenden Teil des Kurbelgehäuses (11) des Mo-
tors befindet, und dass die Einlassleitung (13) des
Motors von der Einlassöffnung (9) bis hoch zur
Treibstoffzuführungseinheit (5) eine Länge
aufweist ,die größer ist als das 1.8fache des Zylin-
derhubs (18) Motors, und vorzugsweise länger als
2.0 mal dem Zylinderhub (18) ist.

2. Eine Antriebseinheit (1) nach Anspruch 1, **dadurch
gekennzeichnet, dass** ein Endabschnitt (12) der
Einlassleitung (13) des Motors so ausgeführt ist,
dass sie einen festen und wärmeleitenden Teil des
Zylinders (8) bildet, und eine Länge aufweist, die
länger als 0.8 mal dem Zylinderhub, vorzugsweise
1.0 mal den Zylinderhub, ist.

3. Eine Antriebseinheit (1) nach den Ansprüchen 1
oder 2, **dadurch gekennzeichnet, dass** der End-
abschnitt (12) der Einlassleitung (13) des Motors
hoch zur Einlassöffnung (9) von einer senkrechten
Richtung bezüglich der axialen Erstreckung des Zy-
linders abweicht und eher in Richtung auf die Ab-
gasöffnung (16) und Verbrennungskammer (14)
des Zylinders gerichtet ist, wodurch der Kolben (15)
und die Zylinderwand (10) der Abgasöffnung (16)
des Motors gekühlt werden.

4. Eine Antriebseinheit (1) nach einem der vorherigen
Ansprüche, **dadurch gekennzeichnet, dass** wenn
das Werkzeug auf einen horizontalen Untergrund
placiert wird, die Kurbelwelle (17) im wesentlichen
horizontal ist und der Zylinder (8) eine im wesentli-
chen horizontale axiale Erstreckung aufweist ,d.h.
seine Mittellinie (30) mehr als 45 Grad bezüglich ei-
ner senkrechten Linie geneigt ist, und dass seine
Einlassleitung (13) und Treibstoffzuführungsleitung
(5) sich im wesentlichen am oberen Ende des Zy-
linders (8) befinden, d. h. oberhalb einer Ebene, die
sich durch die Mitte der Kurbelwelle (17) und die
Mitte (30) des Zylinders erstreckt.

5. Eine Antriebseinheit (1) nach einem der vorherigen

Ansprüche, **dadurch gekennzeichnet, dass** ein
stromaufwärts gelegener Teil (19) der Einlasslei-
tung (13) des Motors mit den Endabschnitt (12) ver-
bunden ist und sich zu der Treibstoffzuführungsein-
heit (5) hin fortsetzt.

6. Eine Antriebseinheit (1) nach Anspruch 4 oder 5,
dadurch gekennzeichnet, dass sich ein Griff (20)
mit einer Drosselsteuerung (21) über der Motorein-
heit (4) befindet, so dass die Längsrichtung des
Griffs im wesentlichen parallel zur Mittellinie (30)
des Zylinders ist.

7. Eine Antriebseinheit (1) nach Anspruch 6, **dadurch
gekennzeichnet, dass** der Drosselgriff (21) sich im
wesentlichen gerade über den Mittelpunkt der Kur-
belwelle (17) befindet.

8. Eine Antriebseinheit (1) nach Anspruch 6 oder 7, **da-
durch gekennzeichnet, dass** sich die Treibstoff-
zuführungseinheit (5) vor einer Aussparung (22) im
Griff (20) befindet, d.h. in einer Richtung, die vom
oberen Abschnitt des Zylinders weiter entfernt ist.

9. Eine Antriebseinheit (1) nach einem der vorherigen
Ansprüche, **dadurch gekennzeichnet, dass** die
Einlassöffnung (9) sich in der Zylinderwand (10) be-
findet, und dass ihr Öffnen und Schließen durch die
Bewegung des Kolbens (15) gesteuert wird.

10. Eine Antriebseinheit (1) nach einem der Ansprüche
4 - 9, **dadurch gekennzeichnet, dass** bei der Ver-
wendung für eine Kettensäge die Führungsscheine
(23) der Säge, mit der Sägenkette, im wesentlichen
in dieselbe Richtung wie die Treibstoffzuführungs-
einheit (5), d.h. vom oberen Abschnitt des Zylinders
weg gerichtet ist.

11. Eine Antriebseinheit nach einem der Ansprüche 5
- 10, **dadurch gekennzeichnet, dass** die Motorein-
heit (4) elastisch im Gehäuseteil (2) aufgehängt und
die Treibstoffzuführungseinheit (5) im Gehäuseteil
montiert ist und dass der stromaufwärts gelegene
Teil (19) der Einlassleitung (13) des Motors aus ei-
nem nachgiebigen Material, wie zum Beispiel Gum-
mi, besteht.

12. Eine Antriebseinheit (1) nach Anspruch 11, **da-
durch gekennzeichnet, dass** der stromaufwärts
gelegene Teil (19) eine im wesentlichen glatte In-
nenseite aufweist.

13. Eine Antriebseinheit nach den Ansprüchen 5, 11
oder 12, **dadurch gekennzeichnet, dass** der
stromaufwärts gelegene Teil (19) sich im wesentli-
chen in der selben Richtung wie der Endabschnitt
(12) nach oben zur Treibstoffzuführungseinheit (5)
fortsetzt, die sich auf einer Seite der Antriebseinheit

(1) befindet, wobei die Seite im wesentlichen der Seite der Antriebseinheit gegenüberliegt, bei dem sich der obere Abschnitt des Zylinders, im allgemeinen mit einer Zündkerze (24), befindet.

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Revendications

1. Unité d'entraînement (1) destinée à un outil de travail à main, par exemple une scie à chaîne, une machine à tailler ou une tailleuse de haie, ladite unité d'entraînement comprend essentiellement une partie de carter (2) comportant un réservoir de carburant (3) et un ensemble moteur (4) avec une unité d'alimentation en carburant (5), par exemple un carburateur (5), un silencieux (6) et un moteur à combustion interne à balayage de carter moteur (7) comportant un cylindre (8), un piston (15) et un vilebrequin comportant un axe (17),
caractérisé en ce que le moteur (7) comporte au moins un orifice d'admission (9) situé dans la paroi de cylindre du moteur (10) et / ou dans une partie proche du carter moteur (11) et **en ce que** le conduit d'admission du moteur (13) à partir de l'orifice d'admission (9) jusqu'à l'unité d'alimentation en carburant (5) a une longueur de 1,8 fois plus grande que la course du cylindre du moteur (18), de préférence une longueur 2,0 fois plus grande que la course du cylindre du moteur (18).
2. Unité d'entraînement (1) selon la revendication 1, **caractérisée en ce qu'une** section d'extrémité (12) du conduit d'admission du moteur (13) est réalisée de manière à former une partie fixe et conductrice de chaleur du cylindre (8) et a une longueur supérieure à 0,8 fois la course de cylindre du moteur, de préférence, plus longue que 1,0 fois la course du cylindre.
3. Unité d'entraînement (1) selon la revendication 1 ou la revendication 2, **caractérisée en ce que** la section d'extrémité (12) du conduit d'admission du moteur (13) jusqu'à l'orifice d'admission (9) dévie d'une direction perpendiculaire par rapport à l'extension axiale du cylindre, et est dirigée davantage vers l'orifice d'échappement (16) et la chambre de combustion (14) du cylindre, ce qui permet de refroidir le piston (15) et la paroi de cylindre (10) au niveau de l'orifice d'échappement du moteur (16).
4. Unité d'entraînement (1) selon l'une quelconque des revendications qui précèdent, **caractérisée en ce que**, lorsque l'outil est placé au sol sur un plan horizontal, le vilebrequin (17) est essentiellement à l'horizontale et le cylindre (8) a une extension essentiellement horizontale, à savoir que son axe central (30) est incliné de plus de 45 degrés par rapport à un axe vertical, et que son conduit d'admis-

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sion (13) et son unité d'alimentation en carburant (5) sont essentiellement situés au-dessus du cylindre (8), à savoir au-dessus d'un plan qui s'étend par l'axe central du vilebrequin (17) et l'axe du cylindre (30).

5. Unité d'entraînement (1) selon l'une quelconque des revendications qui précèdent, **caractérisée en ce qu'une** partie en amont (19) du conduit d'admission du moteur (13) est associée à la section d'extrémité (12) et se poursuit jusqu'à l'unité d'alimentation en carburant (5).
6. Unité d'entraînement (1) selon l'une des revendications 4 ou 5, **caractérisée en ce qu'une** poignée (20) comportant une commande des gaz (21) est disposée au dessus de l'ensemble moteur (4) de sorte que la direction longitudinale de la poignée est essentiellement parallèle à l'axe central (30) du cylindre.
7. Unité d'entraînement (1) selon la revendication 6, **caractérisée en ce que** la poignée de commande des gaz (21) est disposée essentiellement juste au-dessus de l'axe du vilebrequin. (17).
8. Unité d'entraînement (1) selon les revendications 6 ou 7, **caractérisée en ce que** l'unité d'alimentation en carburant (5) est située en face d'un retrait (22) aménagé dans la poignée (20), à savoir dans une direction plus éloignée de la section supérieure du cylindre.
9. Unité d'entraînement (1) selon l'une quelconque des revendications qui précèdent, **caractérisée en ce que** l'orifice d'admission (9) est situé dans la paroi de cylindre (10) et **en ce que** son ouverture et sa fermeture sont commandées par le déplacement du piston (15).
10. Unité d'entraînement (1) selon l'une quelconque des revendications 4 à 9, **caractérisée en ce que** dans une application pour scie à chaîne, la barre de guidage (23) de la scie, avec la chaîne scieuse, est essentiellement dirigée dans la même direction que l'unité d'alimentation en carburant (5), à savoir en s'éloignant de la section supérieure du cylindre.
11. Unité d'entraînement (1) selon l'une quelconque des revendications 5 à 10, **caractérisée en ce que** l'ensemble moteur (4) est suspendu de manière élastique dans la partie de carter (2) et que l'unité d'alimentation en carburant (5) est montée dans la partie de carter, et **en ce que** la partie en amont (19) du conduit d'admission du moteur (13) est composé d'un matériau déformable, par exemple du caoutchouc.

12. Unité d'entraînement (1) selon la revendication 11, **caractérisée en ce que** la partie amont (19) a un côté interne essentiellement lisse.
13. Unité d'entraînement (1) selon les revendications 5, 11 ou 12, **caractérisée en ce que** la partie en amont (19) se poursuit essentiellement dans la même direction que la section d'extrémité (12) jusqu'à l'unité d'alimentation en carburant (5) qui est située sur un côté de l'unité d'entraînement (1), ledit côté est essentiellement à l'opposé du côté de l'unité d'entraînement où est située la section supérieure de cylindre qui comporte de manière générale une bougie d'allumage (24).
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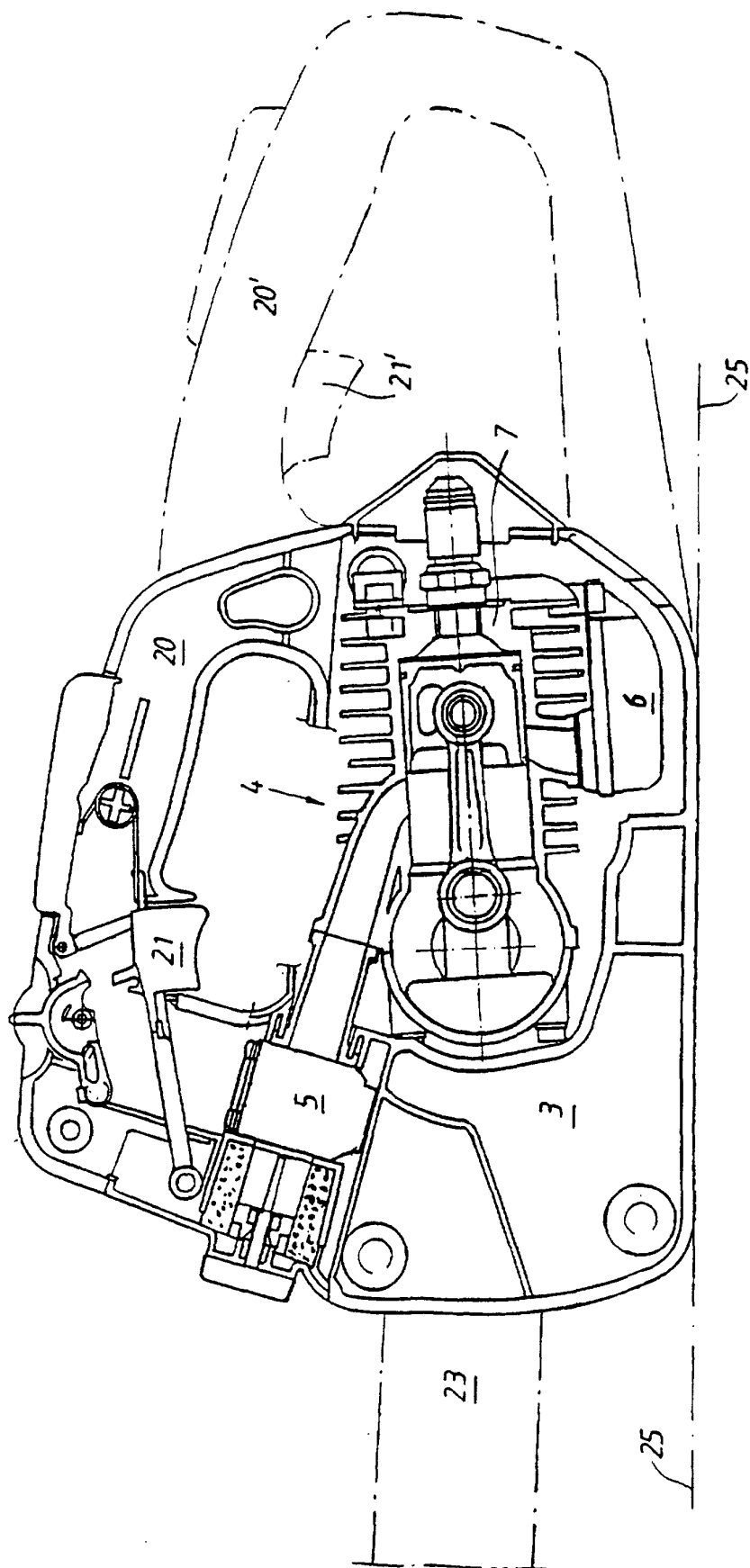


Fig.1

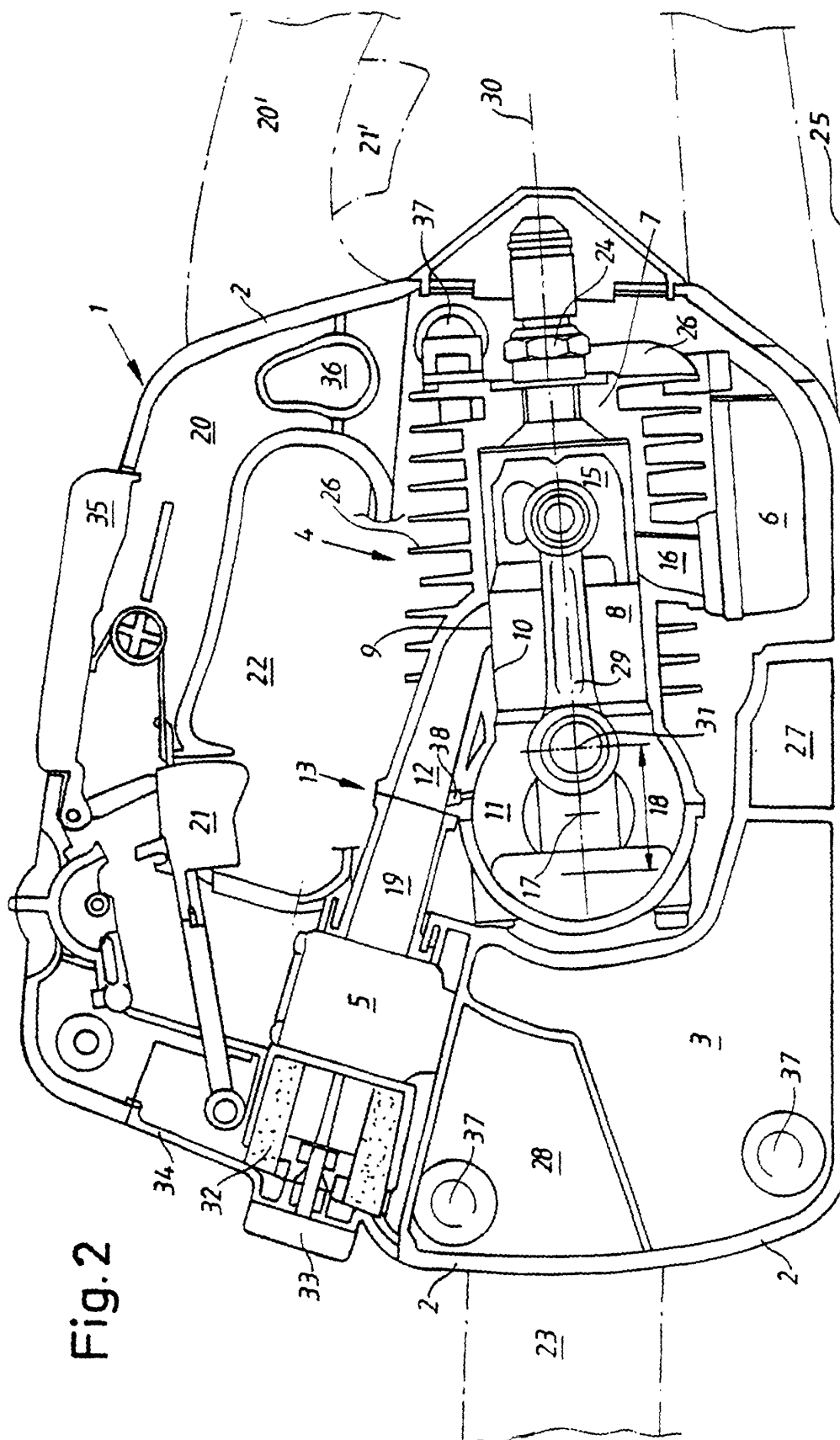


Fig. 2